REMARKS

The application includes claims 13-18, 20, 21, 38-40, 42-44, 50, 51, 53-55, and 57 prior to entering this amendment.

The examiner rejected claims 13-18, 20, 21, 38-40, 42-44, 50, 51, 53-55 and 57 under 35 U.S.C. § 103(a) as being unpatentable over the applicants' admitted prior art (AAPA) in view of Rate Control for Robust Video Transmission Over Burst-Error Wireless Channels (Hsu), Lee et al. (U.S. Patent 6,351, 491), and Ozkan et al. (U.S. Patent 6,055,270).

The applicants amend claims 13, 15-18, 20, 21, 38-40, 42, 43, 44, 51, and 55 and add new claims 58-72.

The application includes claims 13-18, 20, 21, 38-40, 42-44, 50, 51, 53-55, and 57-72 after entering this amendment.

The applicants do not add new matter and respectfully request reconsideration.

Claim Rejections Under § 103

The examiner rejected claims 13-18, 20, 21, and 38-40, 42-44, 50, 51, 53-55 and 57 under § 103(a) over AAPA in view of Hsu, Lee, and Ozkan. The applicants traverse the rejections for at least the reasons that follow.

Independent claim 13

As amended, claim 13 recites *generating, using a plurality of encoders, a plurality of separately transrated output bitstreams from a compressed input bitstream running at a variable rate.* The examiner alleged that it would have been obvious to combine the AAPA, allegedly disclosing variable length decoding and encoding but only one output, with Hsu, allegedly disclosing a plurality of outputs each bridging a Discrete Cosine Transform (DCT) and associated quantizer.[1] However, Hsu does not describe that its video input (disclosing the recited input stream according to the examiner) is "running at a variable rate," as recited, and indeed such a condition is incompatible with its stated operation.

Hsu studies "the problem of rate control for transmission of video over burst-error wireless channels, i.e., channels such that errors tend to occur in clusters during fading periods."[2]

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1 Office action, dated 12/23/08, page 3 and Hsu, Fig. 3.

2 Hsu, abstract, first sentence.

In Hsu, the quantizer values may be selected in accordance with equations (7) and (8), which indicate that for a particular picture block (m+1, m+2, ..., n) a quantizer x^* is chosen giving minimum encoding distortion D subject to the encoding rate R kept low enough so that the variable bit rate capacity of the channel C (k) is not exceeded. The variable bit rate channel capacity C (k) is summed over a defined range, which in part is determined by a constant F describing the number of packets per processed group of blocks (GOB).[3] The constant F, in turn, may be expressed as a ratio Tg/Tp where Tg is the interval (in seconds) per GOB and Tp is the interval per packets.[4] To derive a workable set of equations, however, Hsu assumes Tp is constant,[5] which means that Tg, the interval per GOB, is also constant. That is to say, each separately grouped block of pictures in Hsu's video input is assumed to be restricted to a constant interval or bit rate.[6] In effect, Hsu restricts the type of video input its system accepts so that it may systematically compensate for a transmission channel of variable bit rate capacity. This is inapposite to the context in which applicants' claim 13 embodiment may suitably operate where the video input is comprised of different programming streams "all running at variable bit rates (VBRs)" which are then multiplexed to form "a single constant-bit-rate (CBR) stream" for downstream decoding in "real-time."[7] Hsu's teachings, then, do not apply where the input bit stream(s) is (are) "running at a variable bit rate," as recited in claim 13.

Claim 13 further recites incorporating the plurality of output bitstreams *into a video block for the compressed input bitstream*, which video block includes, inter alia, an *input* video segment and at least one *output* video segment, and *selecting from the video block for the compressed input bitstream only one of the video segments for outputting responsive to bitrate demands of other concurrent output streams from at least one other compressed input bitstream.*[8] The examiner acknowledged that the combination of AAPA and Hsu failed to show either incorporating the output bitstreams into a video block or selecting the segments responsive to the

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3 Hsu, page 759, first paragraph under the heading "B. Rate Constraints."

4 Id.

5 Id. "The encoded video data is packetized into constant-size packets before transmission. We make the assumption that each packet interval has a duration Tp s."

6 Id.

7 Specification, paragraph [0006].

8 In applicants' Fig. 7, for example, output bitstreams for input 705 are incorporated into video block 750 including input segment 705 and output segment 710. In applicants' Fig. 9, video blocks 910 and 920 so derived from respective inputs are passed to bit rate switch 330, which determines which segment to select from which block "based on the bit rate demands" of the "concurrent" programming streams as described in paragraphs [0072] and

bit rate demands of concurrent streams. The examiner alleged, however, that the missing disclosure is found in Lee and Ozkan.[9] To the extent the examiner relied on both Hsu and Ozkan in the same combination, the proposed combination would have been unobvious to one of ordinary skill due to fundamental design incompatibility. As noted above, the primary goal in Hsu is to provide for transmission over a wireless channel subject to fading errors, that is, over a transmission channel of variable bit rate (VBR) capacity.[10] In stark contrast, Ozkan assumes a constant bit rate (CBR) transmission channel.[11]

Claim 13 further recites that in the video block for the compressed input bitstream each video segment is *differently offset within the video block.*[12] According to the examiner, Lee disclosed data elements incorporated into a "video block," but these elements (segments) do not comprise, as recited, an "input" video segment and at least one "output" video segment with "each video segment being differently offset within the video block."[13] Instead, Lee's elements 610, 620, 630, and 640 are embedded within one another so that each larger segment fully embeds, and shares a common starting point or offset with, the next largest segment.[14] Thus, during decoding, Lee provides a minimum level of image information starting at the beginning of the integrated bitstream portion 600 (block), and Lee's bitstream may be truncated to capture a "relevant portion" of the bitstream (610, 620, 630, or 640) and provide a suitable level of "resolution" or decoded image quality[15] (e.g., as also consistent with the performance limits of the decoder being used). Lee's "recursive" or "hierarchical" or embedded arrangement of elements within each integrated stream portion[16] do not result in segments that are "differently offset," as claimed.

[0075]. The segments are selected "dynamically because of the VBR nature" of the streams. See e.g., paragraph [0078].

9 Office action, dated 12/23/08, pages 3-4.

10 See footnote 2.

11 An important concern in Ozkan is to avoid exceeding the "maximum bit rate" of the transmission link, col. 1, lines 49-52, which is achieved by controlling the output of each separate encoder 14 to provide a constant bit rate, col. 5, lines 33-40 and col. 7, lines 4-6.

12 See specification, Fig. 7 and paragraph [0063].

13 Id.

14 Lee applies "discrete wavelet transforms" in a "hierarchical" coding scheme in which each longer (or finer scale or higher quality/Signal-to-Noise ratio) element "recursively" incorporates each shorter (or courser scale or lower quality/Signal-to-Noise ratio) element. Lee, col. 1, lines 49-56, col. 2, lines 30-34, col. 3, lines 46-50, col. 4, lines 47-59, and col. 5, lines 34-39 and 52-55.

15 Lee, col. 5, lines 55-61.

16 See footnote 12.

For at least the above reasons, then, the examiner's assertion that claim 13 is obviousness over AAPA in view of Hsu, Lee, and Ozkan is untenable and claim 13, as amended, stands in condition for allowance.

Dependent claims 14-18, 20-21, 50-51, 53, and 58-66

These claims each depend from claim 13 and likewise patentably define over the proposed combination of AAPA in view of Hsu, Lee, and Ozkan. Independently of claim 13, various limitations in the dependent claims define over this art. For example, claim 18 recites *interleaving* of transport packets of the selected at least one output video segment from the video block for the compressed input bitstream with transport packets of the other concurrent output streams from at least one other compressed input bitstream.[17] The examiner alleged that Lee disclosed interleaving of video segments of a particular output with concurrent outputs. But Lee does not show "interleaving" of segments but rather "encapsulating" of each smaller element (segment) within the next largest element.[18]

Dependent claim 51 recites *transmitting at a substantially constant bit rate over a given period* the interleaved packets from the respective compressed input bitstreams, each running at a variable bit rate, to a buffer for outputting to a channel *of an available channel capacity*.[19] There would have been no motivation to make the proposed combination to the extent the combination includes Hsu because Hsu seeks to feed data at a variable bit rate (not the "substantially constant bit rate" recited) to the transmission channel. In particular, Hsu selects between encoder streams of higher or lower bit rate depending on whether the transmission channel is currently at high or low capacity, respectively, as indicated through errors reported by the downstream decoder using reverse feedback. "Transmitting at a substantially constant bit rate" the interleaved packets, as recited, would defeat a critical mechanism relied upon by Hsu for accommodating a variable capacity channel.

Further examples of distinguishing language may be drawn from new dependent claims 58-66. For example, dependent claim 58 recites that selecting of the video segment is controlled

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[17] Referring to applicant's Fig. 9 and paragraphs 0072 and 0075, for example, the packets comprising segment 914 of the first video block 910 may be interleaved with the packets comprising segment 926 of the second video block 920.

[18] For example, Lee's element 610 is encapsulated within the next largest element 620, 620 is encapsulated within element 630, and so on. Refer also to the Remarks portion discussing Lee in connection with claim 18.

[19] See applicant's original specification, pars. 0072 and 0075.

"independently" of the type of post selection (or reverse) feedback used in Hsu. Dependent claim 59 recites that the selecting is performed from information developed from the input bitstream itself, specifically, from the header of the video block for the input bitstream.

Independent claim 38

Similar to the method of claim 13, amended claim 38 recites a structure comprising a plurality of encoders configured *to generate a plurality of separately transrated output bitstreams from a compressed input bitstream.* Claim 38 further recites a formatter module configured to incorporate these output bitstreams into a video block, which video block includes, inter alia, a plurality of video segments corresponding to the output bitstreams, *each video segment being separately encoded* at a different bit rate *while including the same portion of programming content.*[20] Lee, which the examiner relied on to show output bitstreams incorporated into a video block, fails to show "separate" encoding of each data element (segment). Instead, Lee discloses each data segment (except for the smallest) incorporating, embedding, or encapsulating the next largest segment (e.g., element 620 encapsulates element 610). Lee, as discussed above in connection with claim 13, uses a recursive form of coding based on discrete wavelet transforms where, in particular, the image content is first roughly encoded by the smallest element, then less roughly encoded by a next largest element that recursively incorporates the smallest element, and so on through each element.[21] As further discussed above, the resulting integrated bitstream portion in Lee is then readily truncated during decoding to provide a suitable level of image resolution.[22] Lee fails to disclose, as recited in claim 38, a video block comprising a plurality of segments each being "separately" encoded while including the "same portion" of programming content.

Based on the foregoing remarks, then, the examiner's assertion that claim 38 is obviousness over AAPA in view of Hsu, Lee, and Ozkan is untenable and claim 38, as amended, stands in condition for allowance.

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20 See applicant's original specification, par. 0070.
21 See footnote 12.
22 See footnote 13.

Dependent claims 39-40, 42-44, 54-55, 57, and 67-72

These claims each depend from claim 38 and likewise patentably define over the proposed combination of AAPA in view of Hsu, Lee, and Ozkan. Independently of claim 38, various limitations in the dependent claims define over this art. For example, claims 42 and 55 contain language similar to dependent claims 18 and 51, respectively, and are patentable independently of parent claim 38 for reasons like those given above for claims 18 and 51. New dependent claims 67-72 present further limitations that define over the cited art.

Conclusion

The applicants respectfully request reconsideration and allowance of claims 13-18, 20-21, 38-40, 42-44, 50-51, 53-55, and 57-72. The applicants encourage the examiner to call if an interview would further prosecution.

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Respectfully submitted,

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